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Moss Claims 33, 36, 37, 39, 41-44, 47, 48, 50 and 52-57:

33. A plasmid that comprises (A) a segment comprised of (i) a first DNA sequence encoding a polypeptide that is foreign to vaccinia virus and (ii) a vaccinia virus promoter sequence, wherein said promoter sequence is adjacent to and exerts transcriptional control over said first DNA sequence; and, flanking said segment, (B) DNA from a nonessential region of a vaccinia genome.

36. A plasmid according to Claim 33, wherein said plasmid consists essentially of said segment (A) and said DNA (B) and

said first DNA sequence comprises a translational initiator codon.

37. A plasmid according to Claim 33, wherein said promoter sequence is from DNA not contained in said nonessential region.

39. A plasmid according to Claim 33, wherein said promoter is one that in vaccinia virus regulates the thymidine kinase gene or a vaccinia gene encoding a 7.5 K polypeptide.

41. A plasmid according to Claim 33, wherein said nonessential region comprises the vaccinia virus thymidine kinase gene.

42. A plasmid according to Claim 33, wherein said polypeptide is immunogenic.

43. A plasmid according to Claim 42, wherein said immunogenic polypeptide is a hepatitis B virus surface antigen.

44. A recombinant vaccinia virus that comprises a segment comprised of (A) a first DNA sequence encoding a polypeptide that is foreign to vaccinia virus and (B) a vaccinia virus promoter sequence, wherein (i) said promoter sequence is adjacent to and exerts transcriptional control over said first DNA sequence and (ii) said segment is positioned within a nonessential genomic region of said recombinant vaccinia virus.

47. A recombinant vaccinia virus according to Claim 44, wherein said segment consists essentially of said first DNA sequence and said promoter sequence, and wherein said first DNA sequence comprises a translational initiator codon.

48. A recombinant vaccinia virus according to Claim 44, wherein said promoter sequence is from DNA not contained in said nonessential region.

50. A recombinant vaccinia virus according to Claim 48, wherein said promoter sequence is one that in vaccinia virus regulates the thymidine kinase gene or a vaccinia gene encoding a 7.5 K polypeptide.

52. A recombinant vaccinia virus according to Claim 50, wherein said nonessential region comprises a thymidine kinase gene.

53. A recombinant vaccinia virus according to Claim 44, wherein said polypeptide is immunogenic.

54. A recombinant virus according to Claim 53, wherein said immunogenic protein is a hepatitis B virus surface antigen.

55. A method for preparing a vector, comprised of the steps of (A) providing a plasmid and (B) incorporating into said plasmid a segment comprising a chimeric gene that contains (i) a first DNA sequence encoding a polypeptide that is foreign to vaccinia virus; (ii) a vaccinia virus promoter sequence, wherein said promoter sequence is

adjacent to and exerts transcriptional control over said first DNA sequence; and (iii) DNA from a nonessential region of a vaccinia virus genome, said DNA flanking said chimeric gene such that said plasmid can undergo homologous recombination with a vaccinia virus genome in a vaccinia virus-infected cell.

56. A method according to Claim 55, further comprising the step of transfecting a vaccinia virus-infected cell with said plasmid to obtain a recombinant vaccinal virus wherein said chimeric gene is positioned in a nonessential genomic region thereof.

57. A method for producing a protein, comprising the steps of

- (A) providing a recombinant vaccinia virus that contains a segment comprised of (i) a first DNA sequence encoding a polypeptide that is foreign to vaccinia virus and (ii) a vaccinia virus promoter sequence, where (a) said promoter sequence is adjacent to and exerts transcriptional control over said first DNA sequence and (b) said segment is positioned within a nonessential genomic region of said recombinant vaccinia;

- (B) infecting host cells with said recombinant vaccinia virus such that said host cells express said polypeptide; and then
- (C) separating said polypeptide from said host cells.